

# SEQUENCE LISTING

<110> Berzofsky, Jay A.  
 Pastan, Ira H.  
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 The Government of the United States of America  
 as represented by The Secretary of the  
 Department of Health and Human Services

<120> Immunogenic Peptides of XAGE-1

<130> 015280-485100US

<140> US 10/582,703

<141> 2006-06-12

<150> US 60/529,025

<151> 2003-12-12

<150> WO PCT/US04/41639

<151> 2004-12-13

<160> 45

<170> PatentIn Ver. 2.1

<210> 1

<211> 246

<212> DNA

<213> Homo sapiens

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<223> xage-1 p9, 9kD protein expressed from XAGE-1 gene

<220>

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<222> (1)..(246)

<223> xage-1 p9

<400> 1

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Met	Glu	Ser	Pro	Lys	Lys	Lys	Asn	Gln	Gln	Leu	Lys	Val	Gly	Ile	Leu	
1				5				10					15			

cac	ctg	ggc	agc	aga	cag	aag	aag	atc	agg	ata	cag	ctg	aga	tcc	cag	96
His	Leu	Gly	Ser	Arg	Gln	Lys	Lys	Ile	Arg	Ile	Gln	Leu	Arg	Ser	Gln	
			20					25					30			

tgc	gcg	aca	tgg	aag	gtg	atc	tgc	aag	agc	tgc	atc	agt	caa	aca	ccg	144
Cys	Ala	Thr	Trp	Lys	Val	Ile	Cys	Lys	Ser	Cys	Ile	Ser	Gln	Thr	Pro	
		35					40				45					

ggg	ata	aat	ctg	gat	ttg	ggt	tcc	ggc	gtc	aag	gtg	aag	ata	ata	cct	192
Gly	Ile	Asn	Leu	Asp	Leu	Gly	Ser	Gly	Val	Lys	Val	Lys	Ile	Ile	Pro	
	50					55					60					

aaa gag gaa cac tgt aaa atg cca gaa gca ggt gaa gag caa cca caa 240  
Lys Glu Glu His Cys Lys Met Pro Glu Ala Gly Glu Glu Gln Pro Gln  
65 70 75 80

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<211> 81
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Gly Gly His Thr Gln Thr Gln Asn His Thr Ala Ser Pro Arg Ser Pro	
50 55 60	
gta atg gag agc ccc aaa aag aag aac cag cag ctg aaa gtc ggg atc	240
Val Met Glu Ser Pro Lys Lys Lys Asn Gln Gln Leu Lys Val Gly Ile	
65 70 75 80	
cta cac ctg ggc agc aga cag aag aag atc agg ata cag ctg aga tcc	288
Leu His Leu Gly Ser Arg Gln Lys Lys Ile Arg Ile Gln Leu Arg Ser	
85 90 95	
cag tgc gcg aca tgg aag gtg atc tgc aag agc tgc atc agt caa aca	336
Gln Cys Ala Thr Trp Lys Val Ile Cys Lys Ser Cys Ile Ser Gln Thr	
100 105 110	
ccg ggg ata aat ctg gat ttg ggt tcc ggc gtc aag gtg aag ata ata	384
Pro Gly Ile Asn Leu Asp Leu Gly Ser Gly Val Lys Val Lys Ile Ile	
115 120 125	
cct aaa gag gaa cac tgt aaa atg cca gaa gca ggt gaa gag caa cca	432
Pro Lys Glu Glu His Cys Lys Met Pro Glu Ala Gly Glu Glu Gln Pro	
130 135 140	
caa gtt taa	441
Gln Val	
145	

<210> 4  
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<220>  
 <223> xage-1 p16

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Met Leu Leu Trp Cys Pro Pro Gln Cys Ala Cys Ser Leu Gly Val Phe	
1 5 10 15	
Pro Ser Ala Pro Ser Pro Val Trp Gly Thr Arg Arg Ser Cys Glu Pro	
20 25 30	
Ala Thr Arg Val Pro Glu Val Trp Ile Leu Ser Pro Leu Leu Arg His	
35 40 45	
Gly Gly His Thr Gln Thr Gln Asn His Thr Ala Ser Pro Arg Ser Pro	
50 55 60	
Val Met Glu Ser Pro Lys Lys Lys Asn Gln Gln Leu Lys Val Gly Ile	
65 70 75 80	
Leu His Leu Gly Ser Arg Gln Lys Lys Ile Arg Ile Gln Leu Arg Ser	
85 90 95	
Gln Cys Ala Thr Trp Lys Val Ile Cys Lys Ser Cys Ile Ser Gln Thr	
100 105 110	
Pro Gly Ile Asn Leu Asp Leu Gly Ser Gly Val Lys Val Lys Ile Ile	
115 120 125	

Pro Lys Glu Glu His Cys Lys Met Pro Glu Ala Gly Glu Glu Gln Pro  
 130 135 140

Gln Val  
 145

<210> 5  
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<220>  
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 peptide derived from xage-1 14

<220>  
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 <223> Xaa = any amino acid (X-1)

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 <223> Xaa = Leu, Met, Ala, Ile, Val or Thr (X-2)

<220>  
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 <223> Xaa = a hydrophobic residue, Met or Ala (X-3)

<220>  
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 <222> (10)  
 <223> Xaa = Val, Met, Leu, Ala, Ile or Thr (X-4)

<400> 5  
 Xaa Xaa Xaa Pro Ser Ala Pro Ser Pro Xaa  
 1 5 10

<210> 6  
 <211> 10  
 <212> PRT  
 <213> Artificial Sequence

<220>  
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 immunogenic amino terminal end of xage-1, xage-1  
 residues 14-23

<400> 6  
 Gly Val Phe Pro Ser Ala Pro Ser Pro Val  
 1 5 10

<210> 7  
 <211> 10  
 <212> PRT  
 <213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:1Y xage-1 14,  
variant of xage-1 14, immunogenic peptide derived  
from xage-1 14

<400> 7  
Tyr Val Phe Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 8  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:2L xage-1 14,  
variant of xage-1 14, immunogenic peptide derived  
from xage-1 14

<400> 8  
Gly Leu Phe Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 9  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:3M xage-1 14,  
variant of xage-1 14, immunogenic peptide derived  
from xage-1 14

<400> 9  
Gly Val Met Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 10  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:1Y2L xage-1 14,  
variant of xage-1 14, immunogenic peptide derived  
from xage-1 14

<400> 10  
Tyr Leu Phe Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 11  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:2L3M xage-1 14,  
variant of xage-1 14, immunogenic peptide derived  
from xage-1 14

<400> 11  
Gly Leu Met Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 12  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:modified xage-1  
14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 12  
Gly Val Trp Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 13  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:modified xage-1  
14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 13  
Gly Val Tyr Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 14  
<211> 10  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence:modified xage-1  
14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 14  
Thr Val Trp Pro Ser Ala Pro Ser Pro Met  
1 5 10

<210> 15  
<211> 10  
<212> PRT  
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<220>  
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14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 15  
Ser Met Tyr Pro Ser Ala Pro Ser Pro Ile  
1 5 10

<210> 16  
<211> 10  
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<220>  
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xage-1 14

<400> 16  
Ser Val Phe Pro Ser Ala Pro Ser Pro Thr  
1 5 10

<210> 17  
<211> 10  
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<220>  
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14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 17  
Gly Val Trp Pro Ser Ala Pro Ser Pro Met  
1 5 10

<210> 18  
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<212> PRT  
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<220>  
<223> Description of Artificial Sequence:modified xage-1  
14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 18  
Ser Val Trp Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 19  
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<220>  
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14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 19  
Gly Leu Trp Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 20  
<211> 10  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence:modified xage-1  
14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 20  
Ile Val Trp Pro Ser Ala Pro Ser Pro Val  
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<210> 21  
<211> 10  
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<220>  
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14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 21  
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<210> 22  
<211> 10  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence:modified xage-1  
14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 22  
Gly Val Ala Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 23  
<211> 10  
<212> PRT  
<213> Artificial Sequence



<220>  
<223> Description of Artificial Sequence:modified xage-1  
14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 23  
Tyr Leu Phe Pro Ser Ala Pro Ser Pro Met  
1 5 10

<210> 24  
<211> 10  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence:modified xage-1  
14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 24  
Tyr Leu Ala Pro Ser Ala Pro Ser Pro Ile  
1 5 10

<210> 25  
<211> 10  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence:modified xage-1  
14 peptide, immunogenic peptide derived from  
xage-1 14

<400> 25  
Tyr Leu Ala Pro Ser Ala Pro Ser Pro Val  
1 5 10

<210> 26  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:nucleic acid  
sequence encoding SEQ ID NO:6 native sequence

<400> 26  
ggcgtcttcc catcggtccc ttcgccagtg

30

<210> 27  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:nucleic acid  
sequence encoding SEQ ID NO:9 preferred form

<400> 27  
 ggcgatcatgc catcggtcccc ttccgagtg 30

<210> 28  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:nucleic acid  
 sequence encoding SEQ ID NO:11 preferred form

<400> 28  
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<210> 29  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:nucleic acid  
 sequence encoding SEQ ID NO:11 preferred form

<400> 29  
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<210> 30  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:nucleic acid  
 sequence encoding SEQ ID NO:11 preferred form

<400> 30  
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<210> 31  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:nucleic acid  
 sequence encoding SEQ ID NO:11 preferred form

<400> 31  
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<210> 32  
 <211> 10  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:xage-1 33,  
 residues 33-42 of xage-1  
  
 <400> 32  
 Ala Thr Arg Val Pro Glu Val Trp Ile Leu  
 1 5 10  
  
 <210> 33  
 <211> 10  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:xage-1 57,  
 residues 57-66 of xage-1  
  
 <400> 33  
 His Thr Ala Ser Pro Arg Ser Pro Val Met  
 1 5 10  
  
 <210> 34  
 <211> 10  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:immunogenic  
 peptide derived from xage-1 14 where X-1 is Tyr  
  
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 <223> Xaa = Leu, Met, Ala, Ile, Val or Thr (X-2)  
  
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 <221> MOD\_RES  
 <222> (3)  
 <223> Xaa = a hydrophobic residue, Met or Ala (X-3)  
  
 <220>  
 <221> MOD\_RES  
 <222> (10)  
 <223> Xaa = Val, Met, Leu, Ala, Ile or Thr (X-4)  
  
 <400> 34  
 Tyr Xaa Xaa Pro Ser Ala Pro Ser Pro Xaa  
 1 5 10  
  
 <210> 35  
 <211> 10  
 <212> PRT  
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 <223> Description of Artificial Sequence:immunogenic  
 peptide derived from xage-1 14 where X-2 is Leu

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<223> Xaa = any amino acid (X-1)

<220>
<221> MOD_RES
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<223> Xaa = a hydrophobic residue, Met or Ala (X-3)

<220>
<221> MOD_RES
<222> (10)
<223> Xaa = Val, Met, Leu, Ala, Ile or Thr (X-4)

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<210> 36
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:immunogenic
      peptide derived from xage-1 14 where X-3 is Met

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<223> Xaa = any amino acid (X-1)

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<222> (2)
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<220>
<221> MOD_RES
<222> (10)
<223> Xaa = Val, Met, Leu, Ala, Ile or Thr (X-4)

<400> 36
Xaa Xaa Met Pro Ser Ala Pro Ser Pro Xaa
  1                      5                      10

<210> 37
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:immunogenic
      peptide derived from xage-1 14 where X-4 is Val

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<223> Xaa = Leu, Met, Ala, Ile, Val or Thr (X-2)

<220>
<221> MOD_RES
<222> (3)
<223> Xaa = a hydrophobic residue, Met or Ala (X-3)

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<210> 38
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:9-mer created
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<220>
<221> MOD_RES
<222> (3)
<223> Xaa = a hydrophobic residue, Met or Ala (X-3)

<220>
<221> MOD_RES
<222> (9)
<223> Xaa = Val, Met, Leu, Ala, Ile or Thr (X-4)

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Xaa Xaa Xaa Pro Ser Ala Pro Ser Xaa
  1                      5

<210> 39
<211> 9
<212> PRT
<213> Artificial Sequence

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<220>  
<223> Description of Artificial Sequence:9-mer created  
from SEQ ID NO:5 by omitting Ser at position 8

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<221> MOD\_RES  
<222> (2)  
<223> Xaa = Leu, Met, Ala, Ile, Val or Thr (X-2)

<220>  
<221> MOD\_RES  
<222> (3)  
<223> Xaa = a hydrophobic residue, Met or Ala (X-3)

<220>  
<221> MOD\_RES  
<222> (9)  
<223> Xaa = Val, Met, Leu, Ala, Ile or Thr (X-4)

<400> 39  
Xaa Xaa Xaa Pro Ser Ala Pro Pro Xaa  
1 5

<210> 40  
<211> 9  
<212> PRT  
<213> Artificial Sequence

<220>  
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from SEQ ID NO:5 by omitting Pro at position 7

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<222> (1)  
<223> Xaa = any amino acid (X-1)

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<222> (2)  
<223> Xaa = Leu, Met, Ala, Ile, Val or Thr (X-2)

<220>  
<221> MOD\_RES  
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<223> Xaa = a hydrophobic residue, Met or Ala (X-3)

<220>  
<221> MOD\_RES  
<222> (9)  
<223> Xaa = Val, Met, Leu, Ala, Ile or Thr (X-4)

<400> 40  
Xaa Xaa Xaa Pro Ser Ala Ser Pro Xaa  
1 5

<210> 41  
 <211> 10  
 <212> PRT  
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 <220>  
 <223> Description of Artificial Sequence:overall formula  
 for 9-mers created from SEQ ID NO:5  
  
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 <221> MOD\_RES  
 <222> (1)  
 <223> Xaa = any amino acid (X-1)  
  
 <220>  
 <221> MOD\_RES  
 <222> (2)  
 <223> Xaa = Leu, Met, Ala, Ile, Val or Thr (X-2)  
  
 <220>  
 <221> MOD\_RES  
 <222> (3)  
 <223> Xaa = a hydrophobic residue, Met or Ala (X-3)  
  
 <220>  
 <221> MOD\_RES  
 <222> (7)  
 <223> Xaa = Pro or absent (X-5), when absent, X-6 is Ser  
  
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 <223> Xaa = Ser or absent (X-6), when absent, X-5 and X-7 are Pro  
  
 <220>  
 <221> MOD\_RES  
 <222> (9)  
 <223> Xaa = Pro or absent (X-7), when absent, X-5 is Pro and X-6  
 is Ser  
  
 <220>  
 <221> MOD\_RES  
 <222> (10)  
 <223> Xaa = Val, Met, Leu, Ala, Ile or Thr (X-4)

<400> 41  
 Xaa Xaa Xaa Pro Ser Ala Xaa Xaa Xaa Xaa  
 1 5 10

<210> 42  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:exemplar  
 nucleic acid encoding a peptide of SEQ ID NO:39

<400> 42  
 ggcgtcttcc catcggccccc ttcggtg

<210> 43  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplar  
 nucleic acid encoding a peptide of SEQ ID NO:38

<400> 43  
 ggcggtcttcc catcggtcccc tccagtg 27

<210> 44  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplar  
 nucleic acid encoding a peptide of SEQ ID NO:40

<400> 44  
 ggcggtcttcc catcggtctc gccagtg 27

<210> 45  
 <211> 637  
 <212> DNA  
 <213> Homo sapiens

<220>

<223> complete nucleic acid sequence of XAGE-1 with  
 untranslated 5' and 3' ends

<400> 45  
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 ccacagccct taaggcacga gggaacctca ctgcgcatgc tcctttgggtg cccacctcag 120  
 tgcgcatgtt cactgggcgt ctccccatcg gccccttcgc cagtgtgggg aacgcggcgg 180  
 agctgtgagc cggcgactcg ggtccctgag gtctggattc tttctccgct actgagacac 240  
 ggcggaacaca cacaacaca gaaccacaca gccagtccca ggagcccagt aatggagagc 300  
 ccaaaaaaga agaaccagca gctgaaagtc gggatcctac acctgggcag cagacagaag 360  
 aagatcagga tacagctgag atcccagtg cgcacatgga aggtgatctg caagagctgc 420  
 atcagtcaaa caccggggat aaatctggat ttgggttccg gcgtcaaggt gaagataata 480  
 cctaaagagg aacactgtaa aatgccagaa gcaggtgaag agcaaccaca agtttaaatg 540  
 aagacaagct gaaacaacgc aagctgggtt tatattagat atttgactta aactatctca 600  
 ataaagtgtt gcagctttca ccaaaaaaaaa aaaaaaa 637